

CLAIMS

What is claimed is:

1. A print cartridge, comprising:
 - a port;
 - 5 a first valve and a second valve in fluid communication with the port, the first and second valves being configured to selectively operate in open and closed positions;
 - a first chamber in fluid communication with the first valve;
 - a second chamber in fluid communication with the second valve;
 - a printhead disposed outside the first and second chambers, the printhead being in
 - 10 fluid communication with the first and second chambers to permit ink within the first chamber to pass across the printhead as fluid is withdrawn from the second chamber.
2. The print cartridge according to claim 1, further comprising a heating element disposed within the first chamber to heat the ink in the first chamber.
- 15 3. The print cartridge according to claim 1, wherein the print cartridge is configured to pull ink disposed in the first chamber across the printhead and into the second chamber by opening the second valve and removing ink, air, or both from within the second chamber through the second valve while the first valve is in the closed position.
- 20 4. The print cartridge according to claim 1, further comprising a first temperature sensor disposed in the first chamber and a second temperature sensor disposed at the printhead.
- 25 5. The print cartridge according to claim 1, further comprising:
 - a bag disposed in the first chamber;

a bias member disposed in the first chamber, the bias member coupled to the bag to impart a compressing bias on the bag.

6. The print cartridge according to claim 1, further comprising a manifold, the manifold being disposed between the printhead and the first chamber to permit ink to be delivered to the printhead from the first chamber and at least one other source via the manifold.

7. The print cartridge according to claim 1, further comprising a filter disposed between the first chamber and the printhead.

8. A method of controlling the temperature of a printhead mounted on a print cartridge including first and second chambers in fluid communication with a port via first and second valves, respectively, the method comprising:

15 pumping air from the second chamber via the second valve to draw ink disposed within the first chamber across the printhead and into the second chamber while maintaining the first valve closed;

pumping ink into the first chamber via the first valve while maintaining the second valve closed.

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9. The method of claim 8, further comprising:

determining a current temperature of the printhead;

heating the ink in the first chamber with a heating element disposed within the first chamber only if the current temperature of the printhead is less than a predetermined temperature.

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10. The method of claim 8, further comprising:
determining a current temperature of the printhead;
continuing the pumping air from the second chamber via the second valve until
the current temperature of the printhead is below a threshold temperature.

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11. The method of claim 8, further comprising:
first pulling air out of the first chamber via the first valve while maintaining the
second valve closed;

after the first pulling air, pushing ink into the first chamber from an ink supply
10 external to the first chamber;

after the pushing ink, second pulling air out of the first chamber via the first
valve.

12. The method of claim 11, wherein the first pulling, the pushing, and the second
15 pulling are performed by a single pump.

13. The method of claim 11, further comprising ceasing printing before the pumping
air from the second chamber via the second valve.

14. A system comprising:
- a print cartridge having a port
- the print cartridge including first and second valves in fluid communication with the port;
- 5 an ink supply external to the print cartridge;
- a pump external to the print cartridge and in fluid communication with the port and the ink supply;
- a controller configured to maintain the second valve closed and to open the first valve to permit ink delivery from the ink supply to the print cartridge via the first valve
- 10 during a filling operation;
- the controller further configured to maintain the first valve closed and to open the second valve to permit the pump to pull air from the print cartridge via the second valve during a cooling operation.
- 15 15. The system according to claim 14, wherein the print cartridge further comprises:
- a first chamber in fluid communication with the first valve;
- a second chamber in fluid communication with the second valve;
- a printhead disposed outside of the first and second chambers.
- 20 16. The system according to claim 14, wherein the print cartridge further comprises:
- a first chamber in fluid communication with the first valve;
- a second chamber in fluid communication with the second valve;
- a printhead disposed outside of the first and second chambers;
- a heating element disposed within the first chamber.

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17. The system according to claim 14, further comprising:

a motor;

a clutch mechanism coupled to the motor and to the pump to transfer rotational power from the motor to the pump based, the clutch being controlled by the controller.

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18. The system according to claim 14, further comprising:

a motor;

a print media handling mechanism;

a clutch mechanism coupled to the motor, the print media handling mechanism,
10 and to the pump to selectively transfer rotational power from the motor to either the pump or the print media handling mechanism based on control signals received from the controller.

19. A system for controlling the temperature of a printhead mounted on a print
15 cartridge including first and second chambers in fluid communication with a port via first and second valves, respectively, the system comprising:

means for pumping air from the second chamber via the second valve to draw ink disposed within the first chamber across the printhead and into the second chamber while maintaining the first valve closed;

20 means for pumping ink into the first chamber via the first valve while maintaining the second valve closed.

20. A computer readable medium comprising program instructions for:

opening a print cartridge valve;

25 pulling fluid out of a print cartridge via the print cartridge valve;

closing the print cartridge valve based on a current temperature of a printhead at the print cartridge.

21. A method comprising:

determining a current temperature of a printhead;

circulating ink across the printhead only if the determined current temperature of the printhead is above a first threshold temperature;

5 monitoring the current temperature of the printhead;

ceasing the circulating upon detection that the current temperature is below a second threshold temperature.

22. The method of claim 21, further comprising:

10 determining whether a current temperature of ink disposed in a chamber in fluid communication with the printhead is above a threshold temperature;

heating the ink disposed in the chamber based on the determining whether the current temperature of the ink disposed in the chamber in fluid communication with the printhead is above the threshold temperature.

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23. The method of claim 22, further comprising ceasing the heating the ink disposed in the chamber in response to determining that the current temperature of the ink disposed in the chamber is above the threshold temperature.

20 24. The method of claim 22, wherein the heating is performed by a heating element disposed in the chamber.

25. A method of controlling temperature of ink in a print cartridge chamber, the method comprising:

25 determining a current temperature of the ink in the print cartridge chamber;

heating the ink in the print cartridge chamber if the current temperature of the ink is below a first predetermined temperature.

26. The method of claim 25, wherein the heating is performed by a heating element disposed within the print cartridge chamber.

27. The method of claim 25, further comprising ceasing to heat the ink if the current
5 temperature of the ink is above a second predetermined temperature.

28. The method of claim 27, wherein the second predetermined temperature is greater than the first predetermined temperature.

10 29. The method of claim 25 wherein the determining is performed by a temperature sensor disposed within the print cartridge chamber.

30. A print cartridge comprising:

a chamber having ink disposed therein;

15 a printhead in fluid communication with the chamber for ejecting ink;

a first temperature sensor disposed within the chamber for determining a temperature of the ink disposed therein;

a second temperature sensor at the printhead for determining a temperature of the printhead.

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31. The print cartridge of claim 30, wherein the print cartridge further comprises a heating element disposed within the chamber to heat the ink in the chamber.

32. The print cartridge of claim 30, further comprising:

a port;

a first valve disposed between the chamber and the port to regulate fluid flow between the first chamber and the port.

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33. The print cartridge of claim 32, further comprising:

a snorkel;

a second valve disposed between the snorkel and the port to regulate fluid flow between the snorkel and the port.

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34. The print cartridge of claim 30, further comprising a bag disposed in the chamber.